

Application No.: 10/055,560

Docket No.: JCLA8532

AMENDMENTSIn The Claims:

Claims 1-138. (canceled)

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139. (new) A chip packaging method comprising:
joining at least a die and a substrate;
after said joining said at least a die and said substrate, depositing at least a passive device
over said substrate; and
separating said substrate.

140. (new) The method of claim 139, wherein said substrate comprises bulk metal.

141. (new) The method of claim 139, wherein said substrate has at least a cavity for
accommodating said at least a die.

142. (new) The method of claim 139, wherein the steps of forming said substrate
comprise:

forming at least an opening in a first metal layer; and
joining said first metal layer and a second metal layer.

143. (new) The method of claim 142, wherein said forming said at least an opening
comprises punching.

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144. (new) The method of claim 139, wherein said at least a die has a top surface at a horizontal level, said at least a passive device deposited over said horizontal level.

145. (new) The method of claim 144, wherein said at least a die has a lower surface joined to said substrate.

146. (new) The method of claim 144, after said joining said at least a die and said substrate, further comprising depositing at least a trace over said horizontal level.

147. (new) The method of claim 146, wherein said at least a trace is electrically connected to said at least a passive device.

148. (new) The method of claim 146, after said joining said at least a die and said substrate, further comprising depositing a dielectric layer over said horizontal layer, followed by depositing said at least a trace over said dielectric layer.

149. (new) The method of claim 148, wherein said dielectric layer comprises polyimide, benzocyclobutene, porous dielectric material, or stress buffer material.

150. (new) The method of claim 146, after said depositing said at least a trace over said horizontal level, further comprising depositing a dielectric layer over said at least a trace.

151. (new) The method of claim 150, wherein said dielectric layer comprises polyimide, benzocyclobutene, porous dielectric material, or stress buffer material.

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152. (new) The method of claim 146, wherein said depositing said at least a trace over said horizontal level comprising electroplating.

153. (new) The method of claim 146, wherein said depositing said at least a trace over said horizontal level comprising sputtering.

154. (new) The method of claim 146, wherein said at least a die comprises multiple active devices, a signal suited to be transmitted from one of said active devices to at least other one of said active devices through said at least a trace.

155. (new) The method of claim 139, further comprising depositing multiple bonds over said substrate.

156. (new) The method of claim 155, wherein said bonds comprise solder.

157. (new) The method of claim 155, wherein said bonds comprise gold.

158. (new) The method of claim 155, wherein said at least a die has a top surface at a horizontal level, said bonds deposited over said horizontal level.

159. (new) The method of claim 139, wherein said depositing said at least a passive device over said substrate is followed by said separating said substrate.

160. (new) The method of claim 139, wherein said depositing said at least a passive device over said substrate comprises depositing a capacitor over said substrate.

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161. (new) The method of claim 139, wherein said depositing said at least a passive device over said substrate comprises depositing a resistor over said substrate.

162. (new) The method of claim 139, wherein said depositing said at least a passive device over said substrate comprises depositing an inductor over said substrate.

163. (new) The method of claim 139, wherein said depositing said at least a passive device over said substrate comprises depositing a wave-guide over said substrate.

164. (new) The method of claim 139, wherein said depositing said at least a passive device over said substrate comprises depositing a filter over said substrate.

165. (new) The method of claim 139, wherein said depositing said at least a passive device over said substrate comprises depositing a micro electronic mechanical sensor (MEMS) over said substrate.

166. (new) The method of claim 139, wherein said substrate comprises copper.

167. (new) The method of claim 139, wherein said substrate comprises aluminum alloy.

168. (new) The method of claim 139, wherein said separating said substrate comprises mechanical cutting.

169. (new) The method of claim 139, wherein said separating said substrate comprises laser cutting.

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170. (new) A chip packaging method comprising:
joining at least a die and a substrate;
after said joining said at least a die and said substrate, depositing at least a passive device
and at least a trace over said substrate; and
separating said substrate.

171. (new) The method of claim 170, wherein said substrate comprises bulk metal.

172. (new) The method of claim 170, wherein said substrate has at least a cavity for
accommodating said at least a die.

173. (new) The method of claim 170, wherein the steps of forming said substrate
comprise:

forming at least an opening in a first metal layer; and
joining said first metal layer and a second metal layer.

174. (new) The method of claim 173, wherein said forming said at least an opening
comprises punching.

175. (new) The method of claim 170 further comprising depositing a dielectric layer over
said substrate, followed by depositing said at least a passive device and said at least a trace over
said dielectric layer.

176. (new) The method of claim 175, wherein said dielectric layer comprises polyimide,
benzocyclobutene, porous dielectric material, or stress buffer material.

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177. (new) The method of claim 170, after said depositing said at least a passive device and said at least a trace over said substrate, further comprising depositing a dielectric layer over said at least a passive device and said at least a trace.

178. (new) The method of claim 177, wherein said dielectric layer comprises polyimide, benzocyclobutene, porous dielectric material, or stress buffer material.

179. (new) The method of claim 170, wherein said at least a trace is electrically connected to said at least a passive device.

180. (new) The method of claim 170, further comprising depositing multiple bonds over said substrate.

181. (new) The method of claim 180, wherein said bonds comprise solder.

182. (new) The method of claim 180, wherein said bonds comprise gold.

183. (new) The method of claim 170, wherein said at least a die comprises multiple active devices, a signal suited to be transmitted from one of said active devices to at least other one of said active device through said at least a trace.

184. (new) The method of claim 170, wherein said depositing said at least a passive device and said at least a trace over said substrate is followed by said separating said substrate.

185. (new) The method of claim 170, wherein said passive device comprises a capacitor.

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186. (new) The method of claim 170, wherein said passive device comprises a resistor.

187. (new) The method of claim 170, wherein said passive device comprises an inductor.

188. (new) The method of claim 170, wherein said passive device comprises a wave-guide.

189. (new) The method of claim 170, wherein said passive device comprises a filter.

190. (new) The method of claim 170, wherein said passive device comprises a micro electronic mechanical sensor (MEMS).

191. (new) The method of claim 170, wherein said substrate comprises copper.

192. (new) The method of claim 170, wherein said substrate comprises aluminum alloy.

193. (new) The method of claim 170, wherein said separating said substrate comprises mechanical cutting.

194. (new) The method of claim 170, wherein said separating said substrate comprises laser cutting.

195. (new) A chip packaging method comprising:

joining at least a die and a substrate, said die having a top surface at a horizontal level;

after said joining said at least a die and said substrate, depositing at least a passive device over said horizontal level; and

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separating said substrate.

196. (new) The method of claim 195, wherein said substrate comprises bulk metal.

197. (new) The method of claim 195, wherein said substrate has at least a cavity for accommodating said at least a die.

198. (new) The method of claim 195, wherein the steps of forming said substrate comprise:

forming at least an opening in a first metal layer; and

joining said first metal layer and a second metal layer.

199. (new) The method of claim 198, wherein said forming said at least an opening comprises punching.

200. (new) The method of claim 195, after said joining said at least a die and said substrate, further comprising depositing at least a trace over said horizontal level.

201. (new) The method of claim 200, wherein said at least a trace is electrically connected to said at least a passive device.

202. (new) The method of claim 200, after said joining said at least a die and said substrate, further comprising depositing a dielectric layer over said horizontal layer, followed by depositing said at least a trace over said dielectric layer.

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203. (new) The method of claim 202, wherein said dielectric layer comprises polyimide, benzocyclobutene, porous dielectric material, or stress buffer material.

204. (new) The method of claim 200, after said depositing said at least a trace over said horizontal level, further comprising depositing a dielectric layer over said at least a trace.

205. (new) The method of claim 204, wherein said dielectric layer comprises polyimide, benzocyclobutene, porous dielectric material, or stress buffer material.

206. (new) The method of claim 200, wherein said depositing said at least a trace over said horizontal level comprising electroplating.

207. (new) The method of claim 200, wherein said depositing said at least a trace over said horizontal level comprising sputtering.

208. (new) The method of claim 200, wherein said at least a die comprises multiple active devices, a signal suited to be transmitted from one of said active devices to at least other one of said active devices through said at least a trace.

209. (new) The method of claim 195, further comprising depositing multiple bonds over said horizontal level.

210. (new) The method of claim 209, wherein said bonds comprise solder.

211. (new) The method of claim 209, wherein said bonds comprise gold.

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212. (new) The method of claim 195, wherein said separating said substrate comprises mechanical cutting.

213. (new) The method of claim 195, wherein said separating said substrate comprises laser cutting.

214. (new) The method of claim 195, wherein said depositing said at least a passive device over said horizontal level comprises depositing a capacitor over said horizontal level.

215. (new) The method of claim 195, wherein said depositing said at least a passive device over said horizontal level comprises depositing a resistor over said horizontal level.

216. (new) The method of claim 195, wherein said depositing said at least a passive device over said horizontal level comprises depositing an inductor over said horizontal level.

217. (new) The method of claim 195, wherein said depositing said at least a passive device over said horizontal level comprises depositing a wave-guide over said horizontal level.

218. (new) The method of claim 195, wherein said depositing said at least a passive device over said horizontal level comprises depositing a filter over said horizontal level.

219. (new) The method of claim 195, wherein said depositing said at least a passive device over said horizontal level comprises depositing a micro electronic mechanical sensor (MEMS) over said horizontal level.

220. (new) The method of claim 195, wherein said substrate comprises copper.

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221. (new) The method of claim 195, wherein said substrate comprises aluminum alloy.

222. (new) The method of claim 195, wherein said depositing said at least a passive device over said horizontal level is followed by said separating said substrate.

223. (new) A chip packaging method comprising:
providing at least a die having a top surface at a horizontal level; and
depositing at least a passive device over said horizontal level, wherein there is no die under said at least a passive device.

224. (new) The method of claim 223 further comprising depositing at least a trace over said horizontal level.

225. (new) The method of claim 224, wherein said at least a trace is electrically connected to said at least a passive device.

226. (new) The method of claim 224 further comprising depositing a dielectric layer over said horizontal layer, followed by depositing said at least a trace over said dielectric layer.

227. (new) The method of claim 226, wherein said dielectric layer comprises polyimide, benzocyclobutene, porous dielectric material, or stress buffer material.

228. (new) The method of claim 224, after said depositing said at least a trace over said horizontal level, further comprising depositing a dielectric layer over said at least a trace.

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229. (new) The method of claim 228, wherein said dielectric layer comprises polyimide, benzocyclobutene, porous dielectric material, or stress buffer material.

230. (new) The method of claim 224, wherein said depositing said at least a trace over said horizontal level comprising electroplating.

231. (new) The method of claim 224, wherein said depositing said at least a trace over said horizontal level comprising sputtering.

232. (new) The method of claim 224, wherein said at least a die comprises multiple active devices, a signal suited to be transmitted from one of said active devices to at least other one of said active devices through said at least a trace.

233. (new) The method of claim 223, further comprising depositing multiple bonds over said horizontal level.

234. (new) The method of claim 233, wherein said bonds comprise solder.

235. (new) The method of claim 233, wherein said bonds comprise gold.

236. (new) The method of claim 223, wherein said depositing said at least a passive device over said horizontal level comprises depositing a capacitor over said horizontal level.

237. (new) The method of claim 223, wherein said depositing said at least a passive device over said horizontal level comprises depositing a resistor over said horizontal level.

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238. (new) The method of claim 223, wherein said depositing said at least a passive device over said horizontal level comprises depositing an inductor over said horizontal level.

239. (new) The method of claim 223, wherein said depositing said at least a passive device over said horizontal level comprises depositing a wave-guide over said horizontal level.

240. (new) The method of claim 223, wherein said depositing said at least a passive device over said horizontal level comprises depositing a filter over said horizontal level.

241. (new) The method of claim 223, wherein said depositing said at least a passive device over said horizontal level comprises depositing a micro electronic mechanical sensor (MEMS) over said horizontal level.